

SOUTHWEST FISHERIES SCIENCE CENTER
THIRD QUARTER REPORT-FY 2002
For the Period April 1 - June 30, 2002

Submitted by: John Hunter, Division Director, Fisheries Resources Division

Title of Accomplishment or Milestone: Fecundity of Market Squid

Current Status: Completed manuscript

Background Information: *Loligo opalescens*, market squid are taken in a spawning-grounds fishery off California, where nearly all of the catch are mature spawning adults. Market squid live less than a year and die after a short spawning period before all oocytes in their ovary are expended. This led to the possibility of a management strategy to monitor the fishery based on the escapement of eggs. The strategy requires estimation of the fecundity realized by the average squid in the population and is a function of egg deposition and mortality rates.

Purpose of Activity: To investigate fecundity, egg deposition, and mortality of market squid. Estimate fecundity realized by the average squid in the population. Develop models.

Description of Accomplishment and Significant Results: During the market squid spawning period, no oögonia are produced and the standing stock of oocytes declines with ovulation and spawning. This decline in oocytes is correlated with a decline in mantle condition and an increase in the size of the smallest oocyte in the ovary. Potential fecundity (E_P), the standing stock of all oocytes in the ovary just before the onset of spawning, increases with dorsal mantle length (L) where $E_P = 29.8L$. For the average squid (L of 129 mm), E_P is 3844 oocytes. Market squid newly recruited to the spawning population, ovulate about 36% of their potential fecundity during their first spawning interval with fewer oocytes release in subsequent intervals. Only a few percent of the spawning population might live long enough to spawn their maximum lifetime fecundity (78% of their potential fecundity). Modeling indicates that the average daily total mortality rate on the spawning ground may be about 0.45 with the average adult living only 1.67 days. 33% of the potential fecundity of market squid was deposited (escaped) before females were taken by the fishery during December 1998-1999. The rate eggs escape the fishery was modeled and sensitivity of changing daily rates of fishing mortality, natural mortality, and egg deposition was examined. A rapid method to estimate the fecundity of the *L. opalescens* catch was developed.

Significance of Accomplishment: Amendment 10 of CPS Fishery Management Plan adopted June 2002 by the Pacific Fisheries Management Council proposed using fecundity of market squid in the catch (egg escapement) to monitor the market squid fishery.

Problems: None

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